

**WHAT IS CLAIMED IS:**

1. A method for lanthionizing keratin fibers comprising

(a) generating hydroxide ions in a composition, said step of generating

comprising combining:

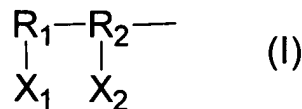
(i) at least one hydroxide composition comprising at least one hydroxide compound; and

(ii) at least one activating composition comprising at least one complexing agent effective for dissociating said at least one hydroxide compound in sufficient quantity to effect lanthionization of said keratin fibers;

(b) applying said composition comprising said generated hydroxide ions to keratin fibers for a sufficient period of time to lanthionize said keratin fibers; and

(c) terminating said lanthionization,

wherein said at least one complexing agent comprises at least one group chosen from groups of formula (I) and salts thereof:



wherein:

- R<sub>1</sub> is chosen from a carbonyl group and a thiocarbonyl group;

- R<sub>2</sub> is chosen from CR groups wherein R is chosen from a direct bond to a neighboring atom, H, optionally substituted linear hydrocarbon groups,

002230-41613650

LAW OFFICES

FINNEGAN, HENDERSON,  
FARABOW, GARRETT,  
& DUNNER, L.L.P.  
1300 I STREET, N. W.  
WASHINGTON, DC 20005  
202-408-4000

- $X_1$  is chosen from hydroxyl groups and thiol groups; and
- $X_2$  is chosen from hydroxyl groups, amino groups, and thiol groups.

5. A method according to claim 1, wherein said at least one hydroxide compound is present in an amount ranging from 0.1% to 10% by weight relative to the total weight of the at least one hydroxide composition.

6. A method according to claim 5, wherein said at least one hydroxide compound is present in an amount ranging from 2% to 5% by weight relative to the total weight of the at least one hydroxide composition.

7. A method according to claim 1, wherein said at least one activating composition further comprises at least one compound effective for forming at least one salt of said groups of formula (I).

8. A method according to claim 7, wherein said at least one compound effective for forming at least one salt of said groups of formula (I) is chosen from hydroxide compounds, which may be identical to or different from said at least one hydroxide compound.

9. A method according to claim 8, wherein at least one compound effective for forming at least one salt of said groups of formula (I) is sodium hydroxide.

10. A method according to claim 1, wherein said at least one activating composition further comprises at least one solvent.

11. A method according to claim 10, wherein said at least one solvent is chosen from water and organic solvents.

12. A method according to claim 10, wherein said at least one solvent is water.

13. A method according to claim 1, wherein said at least one activating composition is in the form of a salt slurry.

14. A method according to claim 1, wherein said at least one complexing agent is chosen from mucic acid wherein said mucic acid is optionally substituted; homologs of mucic acid wherein said homologs of mucic acid are optionally substituted;

09931514-082001

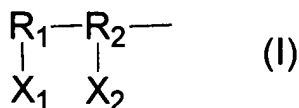
LAW OFFICES

FINNEGAN, HENDERSON,  
FARABOW, GARRETT,  
& DUNNER, L.L.P.  
1300 I STREET, N. W.  
WASHINGTON, DC 20005  
202-408-4000



keratin fibers,

wherein said at least one complexing agent comprises at least one group chosen from groups of formula (I) and salts thereof:



wherein:

- R<sub>1</sub> is chosen from a carbonyl group and a thiocarbonyl group;
- R<sub>2</sub> is chosen from CR groups wherein R is chosen from a direct bond to a neighboring atom, H, optionally substituted linear hydrocarbon groups, optionally substituted branched hydrocarbon groups, optionally substituted cyclic hydrocarbon groups, optionally substituted amino groups, optionally substituted thio groups, optionally substituted hydroxy groups, and halogen atoms;
- X<sub>1</sub> is chosen from hydroxyl groups and thiol groups; and
- X<sub>2</sub> is chosen from hydroxyl groups, amino groups and thiol groups.

23. A composition according to claim 22, wherein said at least one hydroxide compound is chosen from alkali metal hydroxides, alkaline earth metal hydroxides, transition metal hydroxides, lanthanide metal hydroxides, actinide metal hydroxides, Group III hydroxides, Group IV hydroxides, Group V hydroxides, Group VI hydroxides, organic hydroxides, and compounds comprising at least one hydroxide substituent which is at least partially hydrolyzable.

09314-03001

LAW OFFICES

FINNEGAN, HENDERSON,  
FARABOW, GARRETT,  
& DUNNER, L.L.P.  
1300 I STREET, N. W.  
WASHINGTON, DC 20005  
202-408-4000

24. A composition according to claim 23, wherein said at least one hydroxide compound is chosen from calcium hydroxide, barium hydroxide, magnesium hydroxide, aluminum hydroxide, cupric hydroxide, strontium hydroxide, molybdenum hydroxide, manganese hydroxide, zinc hydroxide, and cobalt hydroxide.

25. A composition according to claim 24, wherein said at least one hydroxide compound is calcium hydroxide.

26. A composition according to claim 22, wherein said at least one hydroxide compound is present in an amount ranging from 0.1% to 10% by weight relative to the total weight of the at least one hydroxide composition.

27. A composition according to claim 26, wherein said at least one hydroxide compound is present in an amount ranging from 2% to 5% by weight relative to the total weight of the at least one hydroxide composition.

28. A composition according to claim 22, wherein said at least one complexing agent is chosen from mucic acid, optionally substituted; homologs of mucic acid, optionally substituted; derivatives of mucic acid, optionally substituted; and salts of any of the foregoing.

29. A composition according to claim 22, wherein said keratin fibers are hair.

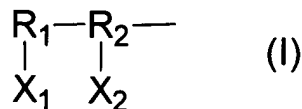
30. A composition according to claim 22, wherein said dissociation is chosen from total dissociation and partial dissociation.

31. A composition according to claim 22, wherein said salts of said groups of formula (I) are chosen from salts comprising organic cations and salts comprising inorganic cations.

05725.0798-00

LAW OFFICES

FINNEGAN, HENDERSON,  
FARABOW, GARRETT,  
& DUNNER, L.L.P.  
1300 I STREET, N. W.  
WASHINGTON, DC 20005  
202-408-4000



- $R_2$  is chosen from CR groups wherein R is chosen from a direct bond to a neighboring atom, H, optionally substituted linear hydrocarbon groups, optionally substituted branched hydrocarbon groups, optionally substituted cyclic hydrocarbon groups, optionally substituted amino groups, optionally substituted thio groups, optionally substituted hydroxy groups, and halogen atoms;
- $X_1$  is chosen from hydroxyl groups and thiol groups; and
- $X_2$  is chosen from hydroxyl groups, amino groups, and thiol groups.

05725.0798-00

LAW OFFICES

FINNEGAN, HENDERSON,  
FARABOW, GARRETT,  
& DUNNER, L.L.P.  
1300 I STREET, N. W.  
WASHINGTON, DC 20005  
202-408-4000